

REMARKS

Favorable reconsideration of this application, in light of the following discussion and in view of the present amendment, is respectfully requested.

Claims 1-16 are pending in the application.

I. Rejection under 35 U.S.C. § 103

In the Office Action, at page 2, numbered paragraph 2, claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,480,042 to Kadowaki in view of U.S. Patent No. 6,597,644 to Kang. This rejection is respectfully traversed because the combination of Kadowaki and Kang does not suggest:

- an optical signal detector which detects an optical signal reflected from an optical disc in a reproduction mode and converts the detected optical signal into an electrical signal;
- a signal amplifier which amplifies the electrical signal according to an amplification gain;
- a gain control signal generator, which generates a first control signal when a voltage level of a driving signal used to drive the optical disc exceeds a predetermined value; and
- a gain switcher which generates a second control signal to control the amplification gain of the signal amplifier in response to the first control signal and a third control signal which designates an initial amplification gain,

as recited in independent claim 14.

As a non-limiting example, the present invention according to claim 1, for example, is directed to an optical signal converter that includes an optical signal detector, a signal amplifier, a gain control signal generator and a gain switcher. The optical signal detector detects an optical signal reflected from an optical disc in a reproduction mode and converts the detected signal into an electrical signal, and the signal amplifier amplifies the electrical signal according to an amplification gain. The gain control signal generator generates a first control signal when a voltage level of a driving signal used to drive the optical disc exceeds a predetermined value. The gain switcher generates a second control signal to control the amplification gain of the signal amplifier in response to the first control signal and a third control signal which designates an initial amplification gain.

Kadowaki discusses an optical head pickup apparatus including a photodetector 31 having photo receivers outputting current signals, which are converted into voltage signals that

are released from the optical pickup head apparatus. The current signals are converted to voltage signals by a differential amplifier composed of a pair of transistors Q1, A2. The voltage signal converted from the current signal is then released as a reference voltage Vc. Switches SW1 and SW2 are provided for switching a connection of either of current source I1 or I2 to the differential amplifier. In Kadowaki, either of the switches SW1, SW2 are closed according to the reflectance of the recording medium or the speed of reproduction. In Kadowaki, when the recording medium having a high reflectance, such as a DVD-ROM, is reproduced, the switch SW1 may be closed, while when the recording medium having a low reflectance, such as a DVD-RAM, is reproduced, the switch SW2 may be closed. If the recording medium has two different speeds for reproduction, the two switches SW1 and SW2 may be switched from one to another according to the reproduction speed. The two switches SW1 and SW2 of Kadowaki are controlled by a switching signal generated according to the reproduction speed or the reflectance of the recording medium.

The Examiner alleges that Kadowaki discusses a gain control signal generator, which generates a first control signal when a reproduction speed is high, and a gain switcher, which generates a second control signal to control the amplification gain of the signal amplifier in response to the first control signal and a third control signal which designates an initial amplification gain. The Applicants respectfully disagree.

Kadowaki does not discuss or suggest that a gain control signal generator generates a first control signal when a reproduction signal is high and that a gain switcher generates a second control signal to control the amplification gain in response to the first control signal and a third control signal which designates an initial amplification gain. In Kadowski, the switches SW1, SW2 switch a connection of either of the current sources I1, I2 based on one of the reflectance of the recording medium or the reproduction speed.

In contrast, in the present invention of claim 14, for example, the gain control signal generator generates a first control signal when a voltage level used to drive the disc exceeds a value and the gain switcher generates a second control signal to control amplification gain in response to the first signal and a third signal designating an initial amplification gain. Thus, in the present invention of claim 14, when the voltage level of the driving signal is too high, the amplification gain may be controlled. Kadowski, however, discusses only that one of the two switches SW1, SW2 provides connection to a current source I1, I2 and that the switches SW1, SW2 are controlled based on either the reflectance of the disc or the reproduction speed.

Kadowaki does not suggest that the reproduction speed and the reflectance are used to control the amplification gain of the signal amplifier.

According to the disclosure of the present application, if a driving signal V_p used to drive an optical disc in a reproduction mode exceeds a maximum output voltage V_{max}, a predetermined gain control signal is generated. The gain switcher selects a gain mode according to a voltage level of an external control signal V_{sw} and when the gain control signal is generated, the gain switcher reduces the amplification gain of the signal amplifier. While Kadowaki suggests that a switching signal, which is based on either the reflectance of the recording medium or the speed of reproduction, closes one of the switches SW1, SW2, Kadowaki is only discussing the generation of one or the other switching signal. Kadowaki does not suggest that a first control signal is generated and then that a gain switcher generates a second control signal based on both the first control signal generated based on whether the driving signal exceeds a maximum driving signal and the third control signal designating an initial amplification gain (i.e., high gain, mid-gain or low gain mode).

The Examiner concedes that Kadowaki does not discuss or suggest that the gain control signal generator generates the first control signal when a voltage level of a driving signal used to drive the optical disc exceeds a predetermined value and alleges that Kang makes up for the deficiency in Kadowaki. The Applicants respectfully disagree.

Kang discusses a method and apparatus for sliding an optical pickup in which, when it is determined that compensation of the optical pickup 2 is needed, the microcomputer 8' detects the current reproduction speed, i.e., the rotational rate of the optical disk 1, based on the driving voltage applied to the driver 7 through the servo unit 6', and if the rotational rate is high, the microcomputer 8' adjusts the gain of the output gain amplifier 64. While Kang does discuss monitoring the reproduction speed, Kang does not make up for the deficiencies in Kadowaki.

Specifically, the combination of the teachings of Kadowaki and Kang does not suggest that a first control signal generated when the driving signal exceeds a predetermined value is used in addition to a third control signal designating an initial amplification gain (i.e., between a high gain, mid-gain and low gain mode) to generate a second control signal controlling the amplification gain. Kang only discusses that the gain is adjusted if the speed is too high, but does not suggest, in combination with Kadowaki, that if the reproduction speed is too high, a first control signal is generated, and then a second control signal is generated in response to the first control signal and a control signal designating an initial amplification gain.

Further, the Examiner does not indicate a motivation to combine the teachings of Kadowaki and Kang. Specifically, "to implement the apparatus of Kadowaki" merely because Kadowaki does not disclose a means for monitoring the speed alone is not a motivation to combine the teachings. Merely asserting that one reference should be used with the other reference provides no suggestion as to why one of ordinary skill in the art would combine the teachings of Kadowaki and Kang. Reciting only that Kadowaki lacks a feature of claim 14 and that Kang discloses such a feature is not an adequate motivation to suggest combining the teachings of the references.

Therefore, as the combination of the teachings of Kadowaki and Kang does not suggest "a gain control signal generator, which generates a first control signal when a voltage level of a driving signal used to drive the optical disc exceeds a predetermined value; and a gain switcher which generates a second control signal to control the amplification gain of the signal amplifier in response to the first control signal and a third control signal which designates an initial amplification gain," as recited in independent claim 14, and as no motivation was specifically cited to combine the teachings of Kadowaki and Kang, claim 14 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 103(a) is respectfully requested.

Claims 15 and 16 depend directly from independent claim 14 and include all the features of claim 14, plus additional features that are not discussed or suggested by the references relied upon. For example, claim 15 recites that "a value of the third control signal corresponds to a type of the optical disc." Therefore, claims 15 and 16 patentably distinguish over the references relied upon for at least the reasons noted above. Accordingly, withdrawal of the § 103(a) rejection is respectfully requested.

II. Allowable Subject Matter

Applicants are appreciative of the indication by the Examiner that claims 1-13 are allowed.

Conclusion

In accordance with the foregoing, claims 1-16 are pending and under consideration.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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